

# Light, Heat & Electricity

## Grade 4

## Teacher's Guide



Lake Erie Nature & Science Center

### Description

In this hands-on, inquiry based field trip, students will experiment with heat, light and electricity to explore energy transformation.

**Length:** 60 minutes. **Adult chaperones recommended:** 4-6

### Content Standards

Subject	Gr	Standard	Objective/"I can" Statements
Physical Science	4	<ul style="list-style-type: none"><li>• Energy transfers from hot objects to cold objects as heat, resulting in a temperature change.</li><li>• Electric circuits require a complete loop of conducting materials through which an electrical energy can be transferred.</li><li>• Electrical energy in circuits can be transformed to other forms of energy, including light, heat, sound and motion.</li><li>• Electricity and magnetism are closely related.</li></ul>	<ul style="list-style-type: none"><li>• I can identify materials that are conductors of heat and electricity</li><li>• I can identify materials that are insulators of heat and electricity</li><li>• I can discuss and define parts of a circuit</li><li>• I can explain the purpose of a switch in a circuit</li></ul>

### Pre-Trip Activities

Measure the temperature of water. Recognize that an increase in temperature indicates an increase in heat energy and a decrease in temperature indicates a decrease in heat energy.

## Vocabulary

insulator  
conductor  
circuit

## Book

- Can You Feel the Force? By Richard Hammond. DK Publishing, 2006.

## Post-Trip Activities at School

- Have students draw a circuit map of the lights in their classroom.
- Discuss how energy converts to heat, causing the warming of devices such as phones and computers.

## Extension Activities

- Use Bare Conductive paint to have students draw their own working circuits on paper.
- Discuss the importance of roof color and road color as acting as an insulator or conductor.
- Electrical Conductors, an interactive simulation from BBC Schools, allows students to explore different materials and classify them as electrical conductors or insulators.
- It also emphasizes that a complete loop of conductors is needed for a circuit to be complete. The optional sections that deal with adding bulbs and batteries are not aligned with this content statement.
- Identify different types of energy conversions within an electrical circuit.
- Use ESFI.org to teach about electrical safety
  - <http://files.esfi.org/file/ESFI-Electricity-Printouts.pdf>

### Other Resources:

<http://files.esfi.org/file/ESFI-Electricity-Printouts.pdf>